Description

The Allen-Bradley Guardmaster GuardShield Safe 2 safety light curtain is a new addition to the ABGM portfolio of opto-electronic safety devices. The “Type 2” designation means that this particular safety light curtain meets a lesser requirement for performance under fault conditions than the GuardShield Type 4 safety light curtains. As a result, the GuardShield Type 2 safety light curtain can only be applied in applications where a formal risk assessment has determined that a Type 2 device is sufficient to meet the level of risk posed by the hazard.

The GuardShield Safe 2 safety light curtain is a self-contained two-box, safety light curtain in a robust housing with an integrated laser alignment system. The integrated laser alignment system generates two visible beams of light which simplifies alignment of the light curtain pair.

This economical opto-electronic Type 2 safety light curtain is offered in a guard only mode of operation and is designed for use on or around machinery or equipment where a formal risk assessment has determined that a Type 2 safety device is of a sufficient level of safety to meet the guarding application.

ATTENTION: Safety light curtains of a Type 2 level of safety typically do not meet OSHA or ANSI requirements of “Control Reliability,” therefore it is not allowable to use a safety device of a Type 2 level on or around equipment or machinery that requires “Control Reliability.”

Features

- M12 connectors
- Optically synchronized
- Integrated laser alignment system
- IP65 enclosure rating
- Simple Instalation
- cULus and CE Marked for all applicable directives

Applications

- Conveyors
- Textile machinery
- Automatic storage and retrieval machinery
- Automated assembly lines

Specifications

Safety Ratings	
Standards	IEC/EN61496 Parts 1 and 2, UL61496 Parts 1 and 2, UL1998
Safety Classification	Type 2 per IEC 61496, Category 2 device per EN 954-1
Certifications	cULus, TÜV, and CE Marked for all applicable directives
Power Supply	
Input Power, Max.	24V DC ± 20%
Maximum Residual Ripple	< 10% of U_{sp}
Power Consumption	<500 mA (no load)
Outputs	
Safety Outputs	2 PNP OSSD. 0.3 A, short-circuit protected
Output Voltage, Min.	$U_{sp\ -1}$
Switching Current @ Voltage, Min.	300 mA @ 24V DC
Operating Characteristics	
Response Time	Varies by protective height
Indicator LEDs	ON -State, OFF-State, internal error
Protected Height [mm (in.)]	120…1920 mm (4.7…75.6 in.) in 120 mm (4.7 in.) increments
Resolution [mm (in.)]	30 mm (1.18 in.)
Scanning Range	0…6 m (0…19.7 ft)
Synchronization	Optical, first beam adjacent to LEDs
Wavelength	950 nm
Environmental	
Enclosure Type Rating	IP65
Relative Humidity	15…95% (noncondensing)
Operating Temperature [C (F)]	0…55 ° (0…131 °)
Vibration	IEC 60068-2-6 frequency 10…55 Hz; amplitude 0.35 mm (0.01 in.)
Shock	IEC 60068-2-29; acceleration 10 g, pulse duration 16 ms 10…55 Hz; amplitude 0.35 mm (0.01 in.)
Physical Characteristics	
Mounting	Rear mounting, standard and adjustable (180°)
Weight	Varies by protective height
Housing Cross Section	30 x 40 mm (1.18 x 1.57 in.)
Connection Type	Transmitter: 5-pin M12 micro QD. Receiver: 5-pin M12 micro QD
Cable Length	2, 5, 10, 15, 20, or 30 m (6.56, 16.4, 32.8, 49.2, 65.6, or 98.4 ft)
ILAS Laser Class	Class 2, IEC 60825-1

Product Selection

1. Safety Light Curtain—Standard System

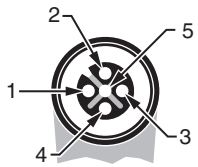
The Allen-Bradley Guardmaster GuardShield Safe 2 safety light curtains are offered in 30 mm resolution, are ordered as pairs—transmitter and receiver—and are shipped under one cat. no. Each GuardShield Safe 2 pair are shipped with mounting brackets. After selecting the appropriate light curtain pair, ensure that the appropriate cables, interfaces, and accessories are ordered as well.

Protected Height [mm (in.)]	Resolution [mm (in.)]	Number of Beams	Pair Weight [kg (lbs)]	Cat. No.
120 (4.7)	30 (1.18)	8	1.0 (2.2)	445L-P2S0120YD
240 (9.4)	30 (1.18)	16	1.4 (3.09)	445L-P2S0240YD
360 (14.2)	30 (1.18)	24	1.8 (3.97)	445L-P2S0360YD
480 (19.9)	30 (1.18)	32	2.2 (4.85)	445L-P2S0480YD
600 (23.6)	30 (1.18)	40	2.6 (5.73)	445L-P2S0600YD
720 (28.3)	30 (1.18)	48	3.0 (6.61)	445L-P2S0720YD
840 (33.1)	30 (1.18)	56	3.5 (7.72)	445L-P2S0840YD
960 (37.8)	30 (1.18)	64	4.0 (8.82)	445L-P2S0960YD
1080 (42.5)	30 (1.18)	72	4.0 (8.82)	445L-P2S1080YD
1200 (47.2)	30 (1.18)	80	4.5 (9.92)	445L-P2S1200YD
1320 (52.0)	30 (1.18)	88	5.0 (11.02)	445L-P2S1320YD
1440 (56.7)	30 (1.18)	86	5.5 (12.13)	445L-P2S1440YD
1560 (61.4)	30 (1.18)	94	6.0 (13.23)	445L-P2S1560YD
1680 (66.1)	30 (1.18)	102	6.5 (14.33)	445L-P2S1680YD
1800 (70.9)	30 (1.18)	110	7.0 (15.43)	445L-P2S1800YD
1920 (75.6)	30 (1.18)	118	7.5 (16.53)	445L-P2S1920YD

Note: The cat. nos. listed above are pair cat. nos., to specify a transmitter or receiver only, substitute the "P" in the cat. no. with a "T" for transmitter or an "R" for receiver.

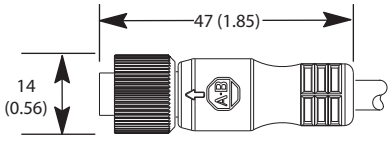
2. Cordsets—Transmitters and receivers both use 5-pin M12 cordsets

Note: Unshielded cordsets are most commonly used for safety light curtains, however, shielded cordsets are also offered to increase immunity to electrical interference.

Female Connector (Sensor End)		Cable			
Face View of Female	Connector Style	Pin/Wire Color	Wire Rating	Length [m (ft)]	Cat. No.
	Straight, Unshielded	1 Brown 2 White 3 Blue 4 Black 5 Grey	22 AWG 250V 4 A	2 (6.5)	889D-F5AC-2
				5 (16.4)	889D-F5AC-5
				10 (32.8)	889D-F5AC-10
				15 (49.2)	889D-F5AC-15
				20 (65.6)	889D-F5AC-20
				30 (98.4)	889D-F5AC-30
	Straight, Shielded	1 Brown 2 White 3 Blue 4 Black 5 Grey	22 AWG 22 AWG 300V 4 A	2 (6.5)	889D-F5EC-2
				5 (16.4)	889D-F5EC-5
				10 (32.8)	889D-F5EC-10
				15 (49.2)	889D-F5EC-15
				20 (65.6)	889D-F5EC-20
				30 (98.4)	889D-F5EC-30

Cordsets Approximate Dimensions [mm (in.)]

Dimensions are not intended to be used for installation purposes.



Straight Female

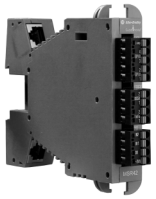
3. Safety Relay Interfaces—Optional

Relay	Safety Outputs	Auxiliary Outputs	Terminals	Power Supply	Reset	Cat. No.
MSR127	3 N.O.	1 N.C.	Removable (Screw)	24V AC/DC	Auto./Manual	440R-N23132
					Monitored Manual	440R-N23135
				115V AC	Auto./Manual	440R-N23131
					Monitored Manual	440R-N23134
				230V AC	Auto./Manual	440R-N23130
					Monitored Manual	440R-N23133
MSR126	2 N.O.	None	Fixed	24V AC/DC	Auto./Manual	440R-N23117
				115V AC		440R-N23116
				230V AC		440R-N23115
				24V AC/DC		440R-N23114
				115V AC		440R-N23113
				230V AC		440R-N23112
				24V AC/DC	Monitored Manual	440R-N23123
				115V AC		440R-N23122
				230V AC		440R-N23121
				24V AC/DC		440R-N23120
				115V AC		440R-N23119
				230V AC		440R-N23118
MSR131RTP	3 N.O.	2 N.C., 2 PNP Solid State	Removable (Screw)	24V AC/DC	Auto./Manual or Monitored Manual	440R-C23139
				115V AC		440R-C23137
				230V AC		440R-C23136
MSR211 ⁎	2 N.O.	1 N.C.	Removable	24V DC from the base unit	Auto./Manual or Monitored Manual	440R-H23177
MSR221	—	—	Removable	24V DC from the base unit	Selected on the base unit	440R-H23179
MSR310	MSR300 Series Output Modules	3 PNP Solid State	Removable	24V DC	Auto./Manual or Monitored Manual	440R-W23219
MSR320 ⁎	—	2 PNP Solid State	Removable	24V DC from the base unit	Selected on the base unit	440R-W23218

⁎ Able to connect to two safety light curtains.

Note: The use of a Category 4 safety relay module does not improve the category rating of the safety relay system beyond the Category 2 rating of the GuardShield Safe 2.

4. Safety Relay Interfaces—Optional (Used for muting applications)

Relay	Input Voltage	Reset	Floating Blanking	Fixed Blanking	PSDI	Muting	Outputs	Cat. No.
MSR22LM	24V DC	Auto./Manual	No	No	Yes	Yes	2 N.O. Safety 1 N.C. Aux.	440R-P23071
 MSR42	24V DC	Auto./manual or manual monitored	No	No	No	Yes	2 PNP, 400 mA	440R-P226AGS-NNR

5. Accessories—Optional

Description		Cat. No.
	Standard kit (4 pieces — supplied with each pair)	445L-AF6140
	Adjustable kit	445L-AF6141
	Shock mount kit	445L-AF6142
	Mounting kit for POC replacement	445L-AF6144
	MSR45E—Expander for MSR42	440R-P4NANS
	USB optical interface software configuration tool	445L-AF6150
	Ribbon cable—for one expander	440R-ACABL1
	Ribbon cable—for two expanders	440R-ACABL2
	Ribbon cable—for three expanders	440R-ACABL3
	Mounting stand	440L-AMSTD

6. Corner Mirror for Multi-Sided Guarding

Specially constructed glass mirrors for 2- and 3-sided safeguarding applications.

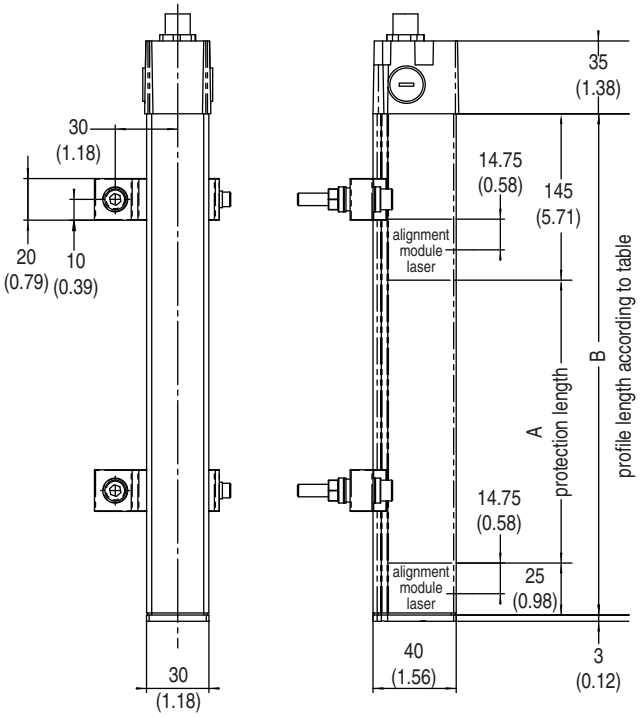
Note: Each mirror reduces maximum scan range by 10% per mirror.

GuardShield Safe 2/Safe 4 Protected Height [mm (in.)]	Narrow Mirror Short-Range 0…4 m	Cat. No.	Wide Mirror Long-Range 4…15 m	Cat. No.
120/140 (4.7/9.4)		440L-AM0750300		440L-AM1250300
360 (14.2)		440L-AM0750450		440L-AM1250450
480 (19)		440L-AM0750600		440L-AM1250600
600 (24)		440L-AM0750750		440L-AM1250750
720/840 (28/33)		440L-AM0750900		440L-AM1250900
960 (38)		440L-AM0751050		440L-AM1251050
1080 (43)		440L-AM0751200		440L-AM1251200
1200 (47)		440L-AM0751350		440L-AM1251350
1320/1440 (52/57)		440L-AM0751500		440L-AM1251500
1560 (61)		440L-AM0751650		440L-AM1251650
1680 (66)		440L-AM0751800		440L-AM1251800
1800/1920 (70.9/75.6)		Not available		Not available

Approximate Dimensions [mm (in.)]

Dimensions are not intended to be used for installation purposes.

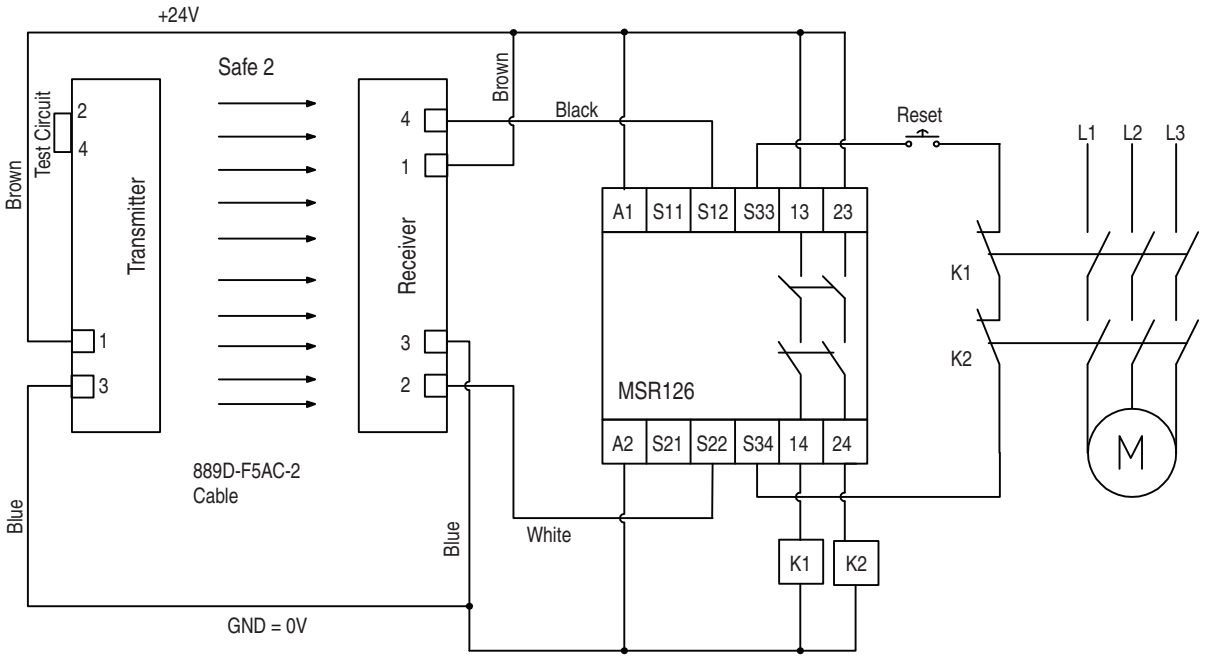
Safety Light Curtain



Type	A Protective Height [mm (in.)]	B Profile Length [mm (in.)]
445L-P2S0120YD	120 (4.7)	290 (11.4)
445L-P2S0240YD	240 (9.4)	410 (16.1)
445L-P2S0360YD	360 (14.2)	530 (20.9)
445L-P2S0480YD	480 (18.9)	650 (25.6)
445L-P2S0600YD	600 (23.6)	771 (30.4)
445L-P2S0720YD	720 (28.3)	891 (35.1)
445L-P2S0840YD	840 (33.1)	1011 (39.8)
445L-P2S0960YD	960 (37.8)	1131 (44.5)
445L-P2S1080YD	1080 (42.5)	1252 (49.3)
445L-P2S1200YD	1200 (47.2)	1372 (54.0)
445L-P2S1320YD	1320 (51.9)	1492 (58.7)
445L-P2S1440YD	1440 (56.7)	1612 (63.5)
445L-P2S1560YD	1560 (61.4)	1733 (68.2)
445L-P2S1680YD	1680 (66.1)	1853 (72.9)
445L-P2S1800YD	1800 (70.8)	1973 (77.7)
445L-P2S1920YD	1920 (75.6)	2093 (82.4)

Wiring Diagram for Connection to MSR126

ATTENTION: Wiring illustrations shown herein are for reference only and NOT intended for installation instructions.



Wiring Diagram for Connection to MSR127